

ABSTRACT OF THE DISCLOSURE

[76] Methods for fabricating refractive element(s) and aligning the elements in a compound optic, typically to a zone plate element are disclosed. The techniques are used for fabricating micro refractive, such as Fresnel, optics and compound optics comprising two or more optical elements for short wavelength radiation. One application is the fabrication of the Achromatic Fresnel Optic (AFO). Techniques for fabricating the refractive element generally include: 1) ultra-high precision mechanical machining, *e.g.*, diamond turning; 2) lithographic techniques including gray-scale lithography and multi-step lithographic processes; 3) high-energy beam machining, such as electron-beam, focused ion beam, laser, and plasma-beam machining; and 4) photo-induced chemical etching techniques. Also addressed are methods of aligning the two optical elements during fabrication and methods of maintaining the alignment during subsequent operation.